

## UMBRELLA FRAME AND OPERATING SYSTEM

### BACKGROUND OF THE INVENTION

#### Claim of Priority

This is a continuing patent application based on a currently pending U.S. patent application having Serial No. 10/008,536, which was filed on November 13, 2001 and which is a continuation-in-part patent application of a prior-filed U.S. patent application, namely, Serial No. 09/330,600 which was filed on June 11, 1999 and which matured into U.S. Patent No. 6,314,976 on November 13, 2001, and also of another prior-filed U.S. patent application, namely, Serial No. 09/433,881 which was filed on November 4, 1999 and which matured into U.S. Patent No. 6,386,214 B1 on May 14, 2002, all of which are incorporated herein in their entirety, by reference.

#### Field of the Invention

This invention relates generally to umbrellas, and more particularly, to a durable and versatile umbrella frame designed to more readily endure abusive weather conditions. The present invention also relates more specifically to an umbrella operating system having improved stabilization qualities and customization features.

1        DESCRIPTION OF THE RELATED ART

2            Outdoor umbrellas are employed to shield people from the  
3        sun, wind, rain, and other elements of nature. As such, they  
4        are intentionally designed to withstand these elements.  
5        Nevertheless, damage to the framework of an umbrella can and  
6        does occur for many reasons, particularly to umbrellas located  
7        in geographical areas of severe and unexpected weather, as well  
8        as umbrellas which have been improperly assembled and/or  
9        installed. Many prior art umbrellas suffer the disadvantages of  
10       not being able to withstand gusts of wind and other harsh  
11       weather as well as not being capable of simple repair when  
12       damage does occur. For example, an umbrella having static wire,  
13       rigid line and an unbalanced construction at the rib and strut  
14       pivot point will wear and often break when extreme forces are  
15       applied over time. Once an umbrella is damaged, it is often  
16       more expensive, time consuming and difficult to repair the  
17       umbrella than to just have it replaced.

18           For umbrellas having individual pivotal connections between  
19       the upper rib and lower strut assembly, the unbalanced nature of  
20       the movement at the pivot point in relation to the upper and  
21       lower central hubs causes unnecessary wear on the pivot junction  
22       as well as to the static wire or rigid line which connects the  
23       canopy rib assembly to the central hubs. This wear is  
24       undesirable and is aggravated over time by the stresses of both  
25       man and nature.

1           For umbrellas having individual pivotal connections between  
2 the upper rib and lower strut assembly by means of a vertically  
3 configured bracket individually, the existing brackets protrude  
4 over the top of the canopy assembly providing a point of  
5 friction between the fabric of the canopy and the rigid  
6 protrusion of the pivot bracket. This creates excessive wear on  
7 a fabric canopy and often creates holes in the fabric canopy.

8           Various umbrella frames are described, for example, in the  
9 following U.S. Patent Nos.: D25,368 to Sparry; D56,043 to  
10 Weinberg et al.; 2,336,116 to Morando; 3,177,882 to Militano;  
11 4,368,749 to Lindler et al.; 4,834,126 to Sweet, Jr.; and  
12 5,715,853 to Lin. None of these umbrella frames show the  
13 structure of the invention recited subsequently herein nor the  
14 benefits or advantages thereby.

15           In addition to the foregoing, many have tried to simplify  
16 and improve the operational features of the umbrella as well as  
17 to add structural stability to the typical umbrella. However,  
18 many such efforts have required the use of a crank to open and  
19 close the umbrella or require placing one's hand in a  
20 compromising position in order to lock and unlock the umbrella  
21 from its open position. Such action is often troublesome and  
22 inconvenient, and can result in injury.

23           Accordingly, there remains a need in the art for a durable  
24 outdoor umbrella having a frame which is structured to allow the  
25 umbrella to be easily opened, and adjusted to various desirable

1 positions and then simply locked or otherwise maintained in  
2 place. Preferably, any such umbrella frame will be structured  
3 to withstand high winds and other abusive weather, and in  
4 addition, to be quickly, easily and inexpensively repaired when  
5 that becomes necessary. If any such umbrella were developed it  
6 would preferably include an operating system for allowing the  
7 umbrella canopy to rotate relative to a central pole member or  
8 other umbrella pole. Further, if any such umbrella were  
9 developed, it would preferably also be easily modified to  
10 accommodate canopies of different sizes and shapes. Finally, if  
11 any such umbrella were developed it would preferably also  
12 include a stabilizing system for improving support of the  
13 umbrella and providing a safer, more effective way to lock and  
14 unlock the umbrella in its fully extended position or other open  
15 or even closed position.

#### 16 17 SUMMARY OF THE INVENTION

18 The present invention is designed to address these and  
19 other needs which remain in the art and relates primarily to a  
20 durable outdoor umbrella frame structured to allow the umbrella  
21 to be easily opened and adjusted to various desired positions  
22 and then reliably maintained in place. Accordingly, and as  
23 explained more in detail subsequently herein, the present  
24 invention includes at least one hub member mounted to an  
25 umbrella pole member and slidable between the top and bottom

1 ends thereof. In a preferred embodiment, the invention  
2 comprises a pair of hub members, namely, one secured to the pole  
3 member near the top end thereof and a main hub member movably  
4 secured about the pole member and slidable therealong to open  
5 and close the umbrella canopy. In addition, the hub members are  
6 preferably mounted on the umbrella pole member so as to both be  
7 rotatable about the pole, and to generally assist in the smooth  
8 operation of the umbrella frame. In this most preferred  
9 embodiment, the hub members are easily mounted to and can be  
10 easily removed from the umbrella pole member for repair and/or  
11 for replacement, if necessary. Further, the hub members ideally  
12 are of a type structured to include a plurality of slots about  
13 their radial edges for receiving a combination of hub connector  
14 joints. A matching number of ribs and struts are pivotally  
15 secured to each hub by these joints, and the struts are  
16 pivotally secured to the ribs by collar members as shown in at  
17 least one illustrated embodiment. The hub connector joints and  
18 the collar members are easily mounted and replaced, and also  
19 assist in the smooth operation of the umbrella frame.  
20 Additionally, the collar members maintain a low profile so as to  
21 avoid contacting and thereby potentially damaging a mounted  
22 canopy.

23 The present invention also provides a versatile umbrella  
24 operating system which allows an umbrella to be safely and  
25 easily opened to almost any degree, easily rotated, and securely

1       stabilized.       As such, the present invention includes an  
2       operating system to allow the umbrella to be easily adjusted to  
3       almost any degree of openness and simply locked or otherwise  
4       maintained in place. In one embodiment, the operating system  
5       comprises but is not limited to a pulley system connecting or  
6       interconnected with the hub members and structured to move the  
7       main hub member up and down a length of the pole towards the top  
8       end of the pole, preferably relative to a top hub member  
9       disposed at the top of the pole. The operating system may  
10      include a stabilizer arm to achieve the opening and/or closing  
11      of the umbrella and/or to bolster support to the umbrella and  
12      provide a safer, more effective way to lock and unlock the  
13      umbrella in its fully extended position.

14             One primary object of the present invention is to provide  
15      an umbrella frame is to provide an umbrella assembly capable of  
16      being opened to a number of desired positions along the umbrella  
17      pole member.

18             Another object of the present invention is to provide an  
19      umbrella assembly which eliminates the need for and/or does not  
20      have to rely upon a crank lift to open and close the umbrella  
21      assembly.

22             It is yet another object of the present invention to  
23      provide an umbrella assembly which eliminates the need for  
24      and/or which does not have to rely upon a security pin beneath  
25      the lower movable hub member to retain the umbrella in a desired

1 vertical position.

2 Another object of the present invention is to provide an  
3 umbrella frame capable of withstanding both hot and cold  
4 temperatures, high wind conditions and other harsh weather.

5 It is another object of the present invention in the  
6 preferred embodiments to provide an umbrella frame having easily  
7 replaceable and interchangeable parts.

8 Yet another object of the present invention is to provide  
9 an umbrella assembly capable of being opened to any desired  
10 vertical position while at the same time being rotatable.

11 It is another object of the present invention to provide an  
12 umbrella frame which can be easily manipulated to allow the  
13 attachment of canopies of varying shapes and sizes.

14 The foregoing list of objects for the invention is meant to  
15 be illustrative only and should not be considered to be limiting  
16 in any sense. As such, these and other objects, features and  
17 advantages of the present invention will become more clear  
18 and/or may be gleaned from the detailed description of the  
19 invention in various preferred embodiment(s), set forth below.  
20

#### 21 BRIEF DESCRIPTION OF THE DRAWINGS

22 Figure 1 is a partial exploded front elevational view in  
23 partial cross-section of an umbrella frame assembly of the  
24 present invention in an embodiment utilizing a retaining pin,  
25 with the umbrella closed position shown in phantom.

1           Figure 2 is an exploded perspective view of a preferred  
2 main hub member and a secondary hub member according to the  
3 present invention and also illustrating preferred hub connector  
4 joints.

5           Figure 3 is an exploded perspective view of a preferred  
6 collar member of the present invention.

7           Figures 4 through 8 are top schematic views showing  
8 examples of different canopy shapes which may be employed with  
9 the present invention.

10          Figure 9 is a partial front elevational view in partial  
11 cross-section of the umbrella frame assembly similar to that  
12 shown in Figure 1, but in an embodiment utilizing a double  
13 pulley system.

14          Figure 10 is a partial front elevational view of another  
15 embodiment of the umbrella operating system of the present  
16 invention, shown with stabilizer arm and support assembly and  
17 with the open position of the umbrella shown in phantom.

18          Figure 11 is a partial front elevational view of the  
19 present invention, similar to that shown in Figure 10, but shown  
20 with a stabilizer arm and a pulley system.

21          Figure 12 is an exploded perspective view of a support  
22 assembly which may be included within the umbrella operating  
23 system of the present invention.

24          Figure 13 is a partial side elevational view of one  
25 embodiment of a pulley system of the umbrella operating system



1 of the present invention.

2 Figure 14 is a partial side elevational view of another  
3 embodiment of a pulley system which may be utilized with the  
4 umbrella operating system of the present invention.

5 Figure 15 is a partial side elevational view of one  
6 embodiment of the pulley system of the umbrella operating system  
7 of the present invention.

8 Figure 16 is a partial side elevational view of another  
9 embodiment of the pulley system of the umbrella operating system  
10 of the present invention.

11  
12 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

13 As shown throughout the various Figures, the present  
14 invention relates to an improved umbrella frame and operating  
15 assembly.

16 With initial reference to Figures 1 through 8, an improved  
17 umbrella frame assembly, generally indicated by reference  
18 numeral 10, according to the present invention will now be  
19 described. The umbrella frame assembly 10 is intended for use  
20 in easily and quickly supporting a variety of shapes and sizes  
21 of umbrella canopies, and is structured to be both durable and  
22 weather resistant. As illustrated in these Figures, the frame  
23 assembly 10 includes a longitudinally extending pole member 12  
24 which can be made of wood, aluminum or other material. In one  
25 embodiment, the pole member 12 is made of 40 gauge aluminum.

1 The pole member 12 has a top end 14 and a bottom end 16. The  
2 bottom end 16 may be easily secured to the ground or any means  
3 of vertical affixment, such as but not limited to a reinforced  
4 concrete base, which for example, might have a star knob and  
5 hitch pin. The bottom end 16 of the pole member 12 might also  
6 be connected to a suitable sturdy base having one or more wheels  
7 incorporated therein so as to render the overall umbrella and  
8 frame movable between various locations.

9 The umbrella frame assembly 10 also comprises at least one  
10 hub member, such as a main hub member 18. More preferably,  
11 however, the frame assembly comprises pair of hub members as  
12 best shown in Figures 1 and 2. The main hub member 18 may be  
13 structured to include a central cavity 20 extending axially  
14 therethrough, which is secured about the pole member 12 and  
15 which is slidable between the top end 14 and bottom end 16 of  
16 the pole member 12. The main hub member 18 is also capable of  
17 rotating about a longitudinal axis of the pole member 12. In  
18 one embodiment of the invention, as shown in the Figures, the  
19 main hub member 18 is provided with a substantially "hour glass"  
20 shaped base portion 22 having an upper portion 24 and a lower  
21 portion 26 and a waist portion 28 which is of smaller diameter  
22 than the upper portion 24 and lower portion 26. The shape of  
23 the base portion 22 is more comfortably structured to allow for  
24 simple hand manipulation of the hub member 18 up and down the  
25 pole member 12.

1           As shown in Figure 2, an upper or secondary hub member 30  
2           is preferably provided and will be disposed near the top end 14  
3           of the pole member 12, as shown in Figure 1. The secondary hub  
4           member 30 may be structured to include, but does not necessarily  
5           have to include, a central cavity 32 extending axially  
6           therethrough, wherein the cavity includes a pole receiving  
7           portion 34 and a narrower upper portion 36 with an aperture  
8           formed therein. The upper portion 36 may be defined by an  
9           interior wall 38 so as to maintain the secondary hub member 30  
10          snugly in position at the top end 14 of the pole member 12. The  
11          hub members 18, 30 may be made of injecting molded  
12          thermoplastic, such as DELRIN with TEFLON, to mention a few  
13          examples only, or other known or yet to be developed materials  
14          which resist rust, UV degradation, dry rot, and water damage.  
15          Other rigid and/or flexible materials may also be used.

16          As illustrated in Figure 1, in the preferred embodiment of  
17          the present invention, a threaded bolt 15 extends from the top  
18          end 14 of the pole member 12 through the narrow upper portion 36  
19          of the secondary hub member central cavity 32 such that the  
20          secondary hub member 30 is hangably secured to the pole member  
21          12 near its top end 14. While the secondary hub member 30 may  
22          be freely rotated about the bolt 15 and the pole member 12 near  
23          its top end 14, a nut 17 may be tightened about the bolt 15  
24          which is capable of restricting the movement of and/or of  
25          maintaining the secondary hub member 30 in a substantially snug

1 and rigid position about the pole member 12. When desired, the  
2 nut 17 may be loosened so as to allow the secondary hub member  
3 30 to freely rotate about the longitudinal axis of the pole  
4 member 12. As described more in detail subsequently herein,  
5 this feature allows the umbrella to rotate relative to the pole,  
6 a feature which readily enables the umbrella and frame to endure  
7 windy conditions. A finial or end cap 40 is preferably also  
8 secured to the bolt 15 for aesthetic purposes once a canopy 21  
9 has been positioned atop the umbrella frame assembly 10. The  
10 end cap 40 also maintains the canopy 21 in a secured central  
11 position.

12 It is pointed out by the inventor hereof that the upper end  
13 of the pole member 12 and/or the secondary hub member 30 can be  
14 structured to vary from that shown in the drawings and yet serve  
15 the intended purpose described above. For example, in one  
16 possible alternate embodiment, the secondary hub member 30 may  
17 be structured to include a rigid bolt member which extends  
18 axially downward through the pole receiving portion 34 of the  
19 central cavity 32. In this embodiment, at least the top end 14  
20 of the pole member 12 should comprise a partially hollow  
21 interior sufficiently sized to receive the rigid bolt member of  
22 the secondary hub member 30. Positioning the downwardly  
23 extending rigid bolt member of the secondary hub member 30 into  
24 the at least partially hollow interior of the top end 14 of the  
25 pole member 12 and the pole receiving portion 34 over the

1 exterior of the top end 14, also provides the capability for the  
2 secondary hub member 30 to rotate about the longitudinal axis of  
3 the pole member 12.

4 As shown in Figure 2, the main hub member 18 and secondary  
5 hub member 30 are preferably further provided with slots 42  
6 formed at intervals about their respective radial edges 44. The  
7 slots 42 are ideally three sided and include a base 46, a back  
8 wall 48, and a pair of side walls 50. The back wall 48 faces  
9 radially outwardly from the hub members 18, 30 and the pair of  
10 side walls 50 extend outwardly from the back wall 48 at  
11 diverging angles. In one embodiment of the invention, the slots  
12 42 are approximately 1/4 inch in depth and the back wall 48 is  
13 approximately 3/4 inches in width.

14 As is also shown in Figure 2, the umbrella frame assembly  
15 10 of the present invention preferably comprises hub connector  
16 joints 52 that are insertable within the hub member slots 42 and  
17 which may be secured therein by screws 54, for example. The hub  
18 connector joints 52 may be made of injection molded  
19 thermoplastic or stamped metal, for example. The hub connector  
20 joints 52 are provided with a base portion 56 and a pair of  
21 substantially parallel side walls 58 which define a hub  
22 connector joint aperture 60. The hub connector joints 52 also  
23 have a back face 62 and a pair of corner walls 64 which extend  
24 outwardly from the back face 62 at diverging angles. The back  
25 face 62 and the pair of corner walls 64 mate respectively with

1 the back wall 48 and pair of side walls 50. Thus, the angles  
2 with which the corner walls 64 and pair of side walls 50 diverge  
3 from the back face 62 and the back wall 48, respectively, are  
4 substantially identical. In one embodiment of the invention,  
5 this angle is approximately 104 degrees. Providing the slots 42  
6 with three walls 48, 50 and a base portion 46 ensures a snug fit  
7 of the hub connector joints 52 within the hub member slots 42  
8 and helps prevent the hub connector joints 52 from twisting or  
9 displacing under stress. Further, the depth and width of the  
10 slots 42 allow the hub connector joints 52 to be readily secured  
11 and removed from within the slots using a screw 54, as shown in  
12 Figure 2. While a screw member 54 is shown as the means of  
13 attachment for the hub connector joints 52 within the hub member  
14 slots 42, other forms of attachment may be employed, such as a  
15 machine threaded bolt, fitted notch or other element which  
16 allows the hub connector joints 52 to be easily attached and  
17 removed. As shown in Figure 2, the interior surface 66 of the  
18 hub connector joints 52 may be rounded and substantially U-  
19 shaped so as to provide clearance for rib and strut members, as  
20 described hereinafter. In the embodiment of the invention as  
21 shown in Figure 2, the hub members 18, 30 are each provided with  
22 eight slots 42 so as to accommodate up to eight hub connector  
23 joints 52. Other numbers of slots may be utilized as well.

24 As shown in Figures 1 and 3, the umbrella frame assembly 10  
25 of the present invention preferably also comprises rib members

1 70, which may be pivotally secured to the hub connector joints  
2 52 of the secondary hub member 30. The rib members 70 form the  
3 outer framework of the improved umbrella frame assembly 10 of  
4 the present invention. Strut members 80 are pivotally secured  
5 at an inner end 82 to the hub connector joints 52 of the main  
6 hub member 18 and are pivotally secured at an outer end 84 to  
7 the rib members 70 at a point near the approximate midpoint of  
8 the rib members 70. The strut members 80 provide support for  
9 the rib members 70 when the umbrella frame assembly 10 is in the  
10 extended or open position, thereby collectively providing a  
11 means for supporting the umbrella canopy 21. Pivotal attachment  
12 of the rib members 70 and the strut members 80 to their  
13 respective hub connector joints 52 may be exacted using a single  
14 screw 54 extending through the hub connector joint 52 and rib  
15 member 70 or strut member 80. However, a machine threaded bolt,  
16 a fitted notch or other like joinery that allows the hub  
17 connector joints 52 to be easily replaceable may be utilized.  
18 The rib members 70 and strut members 80 may be made of a variety  
19 of materials such as, by way of example only, aluminum or wood.

20 As shown in Figure 3, the strut members 80 are pivotally  
21 secured to the rib members 70 by a collar member 90. The collar  
22 member 90 includes a pair of substantially parallel outer walls  
23 92 and a central divider wall 94 which combine to define an  
24 upper channel portion 96 and a lower slot portion 98 on opposite  
25 sides of the divider wall 94. The upper portion 100 of the

1 collar member outer walls 92 which define the channel portion 96  
2 includes outwardly diverging side edges 102 and a substantially  
3 flat top edge 104. The channel portion 96 may have a  
4 substantially rounded channel portion interior surface 106  
5 adapted for receiving the rib members 70. When the rib members  
6 70 are in a substantially different shape, the channel portion  
7 96 may be adapted to match that shape. As shown in Figure 3,  
8 the channel portion interior surface 106 extends around over one  
9 half the circumference of the rib member 70. Also, as shown in  
10 Figure 3, the rib members 70 may be secured within the collar  
11 member channel portion 96 by a screw 91 and nut 93. The  
12 substantially flat top edge 104 of the collar member 90 avoids  
13 contact with the umbrella canopy 21 which is positioned over the  
14 rib members 70 and thereby helps prolong the life of the canopy  
15 employed. The strut members 80 are pivotally secured to the  
16 slot portion 98 of the collar member 90 by a screw 91 and nut  
17 93, as shown in Figure 3. Also, as shown in Figure 3, a  
18 substantially cylindrical sleeve member 110 may be employed  
19 between the collar member 90 and the rib member 70 to reinforce  
20 the support provided by the strut member 80 to the rib member  
21 70. In one embodiment of the invention, the sleeve member 110  
22 is made of aluminum.

23 As discussed more fully later herein with reference to  
24 Figures 9 through 16, although the main hub member 18 is movably  
25 and axially attached to the pole member 12, such as but not



1 limited to via central cavity 20 and, therefore, free to both  
2 rotate about and slide along it, the main hub member 18 may be  
3 maintained in a vertical position along the length of the pole  
4 member 12 in several ways. For example, and as shown in Figure  
5 1, one way utilizes a retaining pin 112 attached to the main hub  
6 member 18 which can be placed within a retaining pin slot 114 in  
7 the pole member 12 in order to maintain the vertical position of  
8 the main hub member 18 along the pole member 12. As shown in  
9 Figure 1, the retaining pin 112 can be maintained around the  
10 waist portion 28 of the main hub member by a looped line 116  
11 which allows the main hub member 18 to rotate without binding  
12 the looped line 116. Thus, the retaining pin 112 is secured to  
13 the main hub member 18 in such a manner so as to allow the free  
14 rotation of the hub members 18, 30 about the longitudinal axis  
15 of the pole member 12 even while the pin 112 is in place within  
16 the pin retaining slot 114, thereby maintaining the vertical  
17 position of the main hub member 18 along the pole member 12.  
18 The main hub member 18 may also be formed of two pieces and may  
19 employ ball or roller bearings or the like to allow the two  
20 pieces to move independently of one another in a lateral  
21 direction, while still moving as a single unit up and down the  
22 pole member 12. Such an arrangement allows the retaining pin  
23 112 to remain within its slot 114 and thereby maintain the main  
24 hub member 18 in the upper, frame extended, vertical position  
25 while allowing the remaining components of the umbrella frame

1 assembly 10 to be freely rotated about the longitudinal axis of  
2 the pole member 12.

3 In operation, any desired number and size of rib members 70  
4 and strut members 80 may be employed, depending on the  
5 particular size and shape of the umbrella canopy to be attached.  
6 Because the hub connector joints 52 and collar member 90 are so  
7 easily installed, many different configurations of the canopy  
8 can be achieved with little effort by either increasing or  
9 decreasing the number of hub connector joints 52 present on the  
10 hub members 18, 30. For example, as shown in Figures 4 through  
11 8, four rib members 70 are employed for the square shaped canopy  
12 122 (Figure 4), eight rib members 70 are employed for the  
13 octagonal shaped canopy 124 (Figure 5), three rib members 70 are  
14 employed for the triangular shaped canopy 126 (Figure 6), six  
15 rib members 70 are employed for the rectangular shaped canopy  
16 128 (Figure 7) and five rib members 70 are employed for the  
17 semi-octagonal shaped canopy 130 (Figure 8). The number of rib  
18 members 70 to be employed determines the number of strut members  
19 80, hub connector joints 52, and collar members 90 to be  
20 employed. For example, with four rib members 70, four strut  
21 members 80, eight hub connector joints 52, and four collar  
22 members 90 are employed. For proper operation, the hub  
23 connector joints 52 must be secured within corresponding slots  
24 42 in the main hub member 18 and the secondary hub member 30.  
25 Other geometrical shapes and sizes of canopies may also be

1 employed using the frame assembly of the present invention.

2 Canopies of varying shapes and sizes are attached to the  
3 umbrella frame by unscrewing the finial or end cap 40 from the  
4 top end 14 of the pole member 12 and removing the securing nut  
5 17. The canopy opening is placed over the threaded bolt 15 and  
6 the canopy cuffs are placed around the outer ends of the rib  
7 members 70. The securing nut 17 and end cap 40 are then placed  
8 back onto the threaded bolt 15. In one embodiment of the  
9 invention, the canopy members are SUNBRELLA 100% solution-dyed  
10 acrylic canopies or any other shade-like or non-shade like  
11 material.

12 When the frame is in the retracted position, as shown in  
13 phantom in Figures 1, 9, and 11, the main hub member 18 is near  
14 the middle or even bottom end 16 of the pole member 12,  
15 dependent on its overall length. As the main hub member 18 is  
16 lifted up the pole member 12, the strut members 80 extend  
17 outwardly, thereby expanding the rib members 70 and opening the  
18 attached canopy 21. As the strut members 80 pass the point  
19 where they extend perpendicularly from the pole member 12, the  
20 strut members 80 may be locked into place, such as against a hub  
21 stop member 120 secured to the pole member 12, as shown in solid  
22 lines in Figure 1. The retaining pin 112, described above, can  
23 then be placed within the pin retaining slot 114 formed on the  
24 pole member 12, and the hub member 18 may then be returned  
25 downwardly to rest against the pin 112. In this position, as

1 shown in the dashed lines in Figure 1, the strut members 80  
2 extend in a substantially perpendicular fashion from the pole  
3 member 12 to provide substantial support to the rib members 70.

4 The hub connector joints 52 and the collar members 90 are  
5 also considered to be important inventive steps forward which  
6 significantly improve the structural and long term integrity of  
7 the improved umbrella frame assembly 10. First, the upper  
8 portion 100 of the collar member walls 92 remain below the  
9 height of the rib members 70; thus, the collar members 90 avoid  
10 contacting the canopy 21 during operation of the umbrella frame  
11 assembly 10. Such contact could significantly damage the fabric  
12 of the canopy 21. Secondly, the collar members 90 and the hub  
13 connector joints 52 help maintain the rib members 70 and the  
14 strut members 80 in perfect alignment so that the two  
15 independent hubs 18, 30 act in concert throughout the continual  
16 opening and closing of the umbrella frame assembly 10. The  
17 upper channel portions 96 of the collar members 90 cradle the  
18 rib members 70 and the slot portions 98 of the collar members 90  
19 as well as the hub connector joint apertures 60 straddle their  
20 respective ends of the rib members 70 and strut members 80 and  
21 allow ease of pivotal motion. Due to the interchangeable and  
22 easily replaceable nature of the hub connector joints 52 and  
23 collar members 90, a broken umbrella frame assembly 10 may be  
24 repaired quickly, easily and with minimal cost to the consumer.  
25 Different textures and colors of the hub members 18, 30, the hub

1 connector joints 52, and the collar members 90 are also  
2 available.

3 As noted previously herein, the umbrella frame assembly 10  
4 may also be easily rotated about the longitudinal axis of the  
5 pole member 12 such as by loosening the finial or end cap 40 and  
6 the securing nut 17 from the pole member top end 14, at which  
7 point the hub members 18, 30 are relatively free to rotate in  
8 tandem, such as may be caused by light or strong wind. The  
9 umbrella frame assembly 10 may also employ a pulley system,  
10 described more in detail below, such as that shown in Figure 9  
11 at reference numeral 130, to allow the user to pull the pulley  
12 cord 132 to initiate the raising of the main hub member 18 and  
13 thereby the opening the umbrella frame assembly 10.

14 With reference now to Figures 9 through 16, the improved  
15 operating system for the umbrella frame assembly, generally  
16 indicated by reference numeral 10', of the present invention  
17 will now be described, which is advantageously used in  
18 stabilizing an umbrella and in easily and quickly opening,  
19 closing and rotating an umbrella. As mentioned previously  
20 herein, the main hub member 18 may be maintained in a vertical  
21 position along the pole member 12 in several ways. As an  
22 example, Figure 9 illustrates the invention utilizing the  
23 retaining pin 112 attached to the main hub member 18 which can  
24 be placed within the retaining pin slot 114 in the pole member  
25 12 in order to maintain the vertical position of the main hub

1 member 18 along the pole member 12, while permitting the  
2 rotation of the main hub member 18 about the longitudinal axis  
3 of the pole member 12. Alternatively, the means for maintaining  
4 the main hub member 18 in the vertical position along the pole  
5 member 12 may include a stabilizer arm 150, as shown in Figures  
6 10 and 11, or a pulley system, such as but not limited to that  
7 designated by reference numeral 130 and shown in Figures 9 and  
8 11, and in detail in Figures 13 through 16.

9 As shown in Figures 10, the main hub member 18 may be  
10 maintained in a vertical position about the pole member 12 using  
11 a stabilizer arm 150. The stabilizer arm 150 is secured at a  
12 first end 152 to a strut member 80 by a collar member 154  
13 similar to collar member 90. The second end 155 of the  
14 stabilizer arm 150 is provided with a securing member 156 for  
15 operably coupling the second end 155 to the pole member 12. In  
16 one embodiment of the invention, securing member 156 is a set  
17 screw for insertion into a stabilizer opening 13 on the pole  
18 member 12. The securing member 156 may also be a pinchable  
19 clamp member or other component capable of simple insertion and  
20 removal from the stabilizer opening 13. The second end 155 of  
21 the stabilizer arm 150 is also provided with a locking strap  
22 member 158 which can be positioned around the pole member 12 and  
23 locked together such as by using a snap 159 for added support  
24 and to ensure that securing member 156 does not unintentionally  
25 slip out of position from within the stabilizer opening 13.

1 Using the stabilizer arm 150, the umbrella main hub member 18  
2 can be lifted and lowered without having to use a crank member  
3 or a retaining pin 112 at a location high up on the pole member  
4 12. This facilitates the overall ease of use of the umbrella in  
5 quickly opening, securing, and closing the umbrella frame  
6 assembly 10'.

7 As shown generally in Figures 9 and 11, and in detail in  
8 Figures 13 through 16, the main hub member 18 may also be moved  
9 up and down the pole member 12 using a pulley system, such as  
10 but not limited to, that which will be described with regard to  
11 reference numeral 130. A pulley system allows for an effortless  
12 lift of the main hub member 18 and eliminates the need for a  
13 crank lift or the retaining pin 112 beneath the main hub member  
14 18. The illustrated pulley system 130 of the present invention  
15 allows the remote locking of the main hub member 18 in a  
16 vertical position along the pole member 12 while permitting the  
17 rotation of the entire umbrella frame assembly 10', including  
18 the main hub member 18 and the secondary hub member 30, and the  
19 associated rib members 70, strut members 80, pulley system 130,  
20 and umbrella canopy 21 attached thereto, about the longitudinal  
21 axis of the pole member 12.

22 In the embodiment of the invention as shown in Figure 14,  
23 the pulley system 130 includes a line member 132 having a first  
24 end 134 secured to a bracket member 136 which is secured to the  
25 top surface 25 of the main hub member 18. The line member 132

1 maybe a length of rope, for example. In this embodiment, a  
2 pulley member 138 is secured to the bottom surface 23 of the  
3 secondary hub member 30 and a cam cleat member 140 is secured to  
4 an exteriorly exposed surface of the base portion 22 of the main  
5 hub member 18. The pulley member 138 may be a typical pulley  
6 having a grooved wheel 180 rotatably mounted to a collar member  
7 182 wherein the collar member is movably secured to a bracket  
8 member 184. The pulley system 130 of the present invention  
9 allows the operator to open and maintain the umbrella in any  
10 desired position along the pole member 12 without any additional  
11 locks, pins, or levers by simply pulling the line 132 through  
12 the automatic locking cam cleat member 140.

13 As shown in Figure 14, the cam cleat member 140 includes a  
14 pair of cams 141 each having a toothed side edge 142, and a  
15 retaining bracket portion 144. The pair of cams 141 are  
16 pivotally mounted to the exteriorly exposed surface of the base  
17 portion 22 of the main hub member 18 and the retaining bracket  
18 144 is mounted to the pair of cams 141. In a rested position,  
19 as shown in Figure 14, the toothed side edges 142 of the pair of  
20 cams 141 face one another. In this embodiment, the line member  
21 132 extends from the bracket member 136 through the pulley  
22 member 138 and down through the pair of cams 141. A handle may  
23 be secured to the second end of the line member 132 to promote  
24 ease of operation.

25 Using the pulley system 130 when the umbrella is in its



1 closed position with the main hub member 18 near the bottom end  
2 16 of the pole member 12, the user can pull the line member  
3 handle whereby the line member 132 will be pulled through the  
4 pulley member 138 and the toothed side edges 142. This will  
5 cause the pair of cams 141 to pivot such that the line member  
6 132 will continue to be pulled against the cam smooth outer  
7 surfaces 145. This will pull the bracket member 136 and main  
8 hub member 18 upward so as to open the umbrella. When the user  
9 stops pulling the line member 132, the cams 141 will reverse  
10 pivot and the toothed side edges 142 will engage and prohibit  
11 the movement of the line member 132 in either direction. The  
12 main hub member 18 will thereby be maintained in a vertical  
13 position along the pole member 12 while permitting rotation of  
14 the main hub member 18 and the secondary hub member 30, and the  
15 associated rib members 70, strut members 80, pulley system 130,  
16 and umbrella canopy 21 attached thereto, about the longitudinal  
17 axis of the pole member 12. In this way, the umbrella can be  
18 quickly and easily opened to and maintained at any desired  
19 position without the use of a hand crank or the retaining pin  
20 112 placed below the main hub member 18. When the umbrella is  
21 desired to be closed, the line member 132 can be pulled outside  
22 of the grip of the toothed side edges 142 and released. The  
23 retaining bracket 144 maintains the line member 132 in alignment  
24 with the toothed side edges 142 such that the user can easily  
25 re-engage the line member 132 with the toothed side edges 142 so

1 as to lock the line member 132 at the desired vertical position.  
2 Only the intentional removal of the line member 132 from the  
3 toothed side edges 142 with a deliberate sideways and upward  
4 movement will allow the umbrella to close. The toothed side  
5 edges 142 thus prevents any unintentional closing of the  
6 umbrella from wind gusts or other outside forces.

7 As shown in Figure 14, the pulley system 130 of the present  
8 invention may include a single pulley member, such as but not  
9 limited to, pulley member 138 secured to the bottom surface 23  
10 of the secondary hub member 30 and a bracket member 136 which  
11 may be secured to the top surface 25 of the main hub member 18.  
12 The pulley system 130 of the present invention may also include  
13 first and second pulley members 138 secured to the secondary hub  
14 member 30, as shown in Figure 13. In this arrangement, the line  
15 member 132 extends from the bracket member 136 through a first  
16 pulley member 138 on the secondary hub member 30, through a  
17 pulley member 138 on the main hub member 18, through a second  
18 pulley member 138 on the secondary hub member 30 and down  
19 through the cam cleat member 140. Such an arrangement provides  
20 a mechanical advantage in balance and lifting power to the  
21 device. In one embodiment of this arrangement, the first and  
22 second pulley members 138 of the secondary hub member 30 are  
23 spaced substantially radially equidistant from the axis of the  
24 secondary hub member 30. Other variations on the number of  
25 pulley members 138 employed on each hub member 18, 30 may be

1 used. Since the hub members 18, 30 are rotatable about the  
2 longitudinal axis of the pole member 12, when the nut 17 is  
3 loosened, and the pulley system 130 secured to the hub members  
4 18, 30, this arrangement provides the umbrella of the present  
5 invention with the ultimate in versatility, as the umbrella may  
6 be opened, rotated, and maintained in any desired position  
7 completely free of impediments.

8 As shown in Figure 13, the line member 132 extends  
9 downwardly from the pulley member 138 so as to be substantially  
10 coplanar with a main hub member slot wall 44. This keeps the  
11 line member 132 free from contact with a hub connector joint 52  
12 which could bind and cause unnecessary wear on the line member  
13 132. Also, as shown in Figure 12, the line member 132 may be  
14 retained on a hook member 190 secured to the exteriorly exposed  
15 surface of the base portion 22 of the main hub member 18.

16 As shown in Figures 15 and 16, the secondary hub pulley  
17 members 138 may optionally be secured directly to the pole  
18 member 12 by bracket members 136 which can extend substantially  
19 perpendicularly from the pole member 12, for example. In this  
20 embodiment, the hub members 18, 30 are prohibited from freely  
21 rotating about the pole member 12 because they are  
22 interconnected to the pulley system 130, which is at least  
23 partially secured to the pole member 12 by bracket members 136.

24 As shown in Figures 10 and 12, the pole member 12 may be  
25 stabilized at its bottom end 16 of the pole member 12 using a

1 support assembly 120. The support assembly 120 includes a base  
2 126 having a plate member 124 secured thereto by a hinge member  
3 123, wherein the plate member 124 has a pin member 122 extending  
4 from its inside surface 125. The pin member 122 is receivable  
5 by an opening on the bottom end 16 of the pole member 12. The  
6 base 126 includes a substantially cylindrical tube portion 127  
7 extending from its bottom surface 128 and a base opening 131  
8 extending through the tube 127 for receiving the pole member 12.  
9 In one embodiment of the invention, the pole member 12 is  
10 provided with a pair of axial slots 133 for mating with a  
11 securing rod 135 within the tube 127. The plate member 124 is  
12 hingedly secured to the base 126 such that, when the pole member  
13 12 is removed, the plate member 124 can cover the base opening  
14 131 so as to prevent rain, trash, feet and hands, and other like  
15 elements from falling into the base opening 131. In one  
16 embodiment of the invention, the pin member 122 is a set screw.  
17 In a further embodiment of the invention the pin member 122 can  
18 be a pinchable clamp member insertable and removable from the  
19 pole opening by pinching the sides together. A strap member 129  
20 may also be attached to the plate member 124 and secured about  
21 the pole member 12 for added support. In one embodiment, as  
22 shown in Figure 12, the strap member includes a snapping lock  
23 mechanism 137.

24 The rigidity and density of all the components described  
25 herein can be tempered for a desired flexibility as needed. For

1 example, the pole member 12, rib members 70, and strut members  
2 80 may be comprised of metal, wood or fiberglass but their  
3 construction would not be limited to these rigid compositions.  
4 The nature of thermoplastic construction with materials like  
5 ABS, DELRIN, POLYPROPOLYNE and other ACETALS allow for a degree  
6 of flexibility in the hubs connector joints 52, collar members  
7 90, pulley members 138, and cam cleat members 140 of the  
8 umbrella frame. Because these plastics have a degree of  
9 flexibility, the energy that normally would be absorbed by a  
10 completely static frame umbrella is distributed through all of  
11 the plastic components of the umbrella in heavy wind conditions  
12 or other harsh weather, and thus, use of such materials is  
13 preferable as it should greatly increase the life of the static  
14 frame of an outdoor umbrella, which is generally the more costly  
15 portion of an umbrella unit.

16 The invention may be embodied in other specific forms  
17 without departing from the spirit or essential characteristics  
18 thereof. The present embodiments are therefore to be considered  
19 in all respects as illustrative and not restrictive, the scope  
20 of the invention being indicated by the appended claims rather  
21 than by the foregoing description, and all changes which come  
22 within the meaning and range of equivalency of the claims are  
23 therefore intended to be embraced therein.

24 Since many modifications, variations and changes in detail  
25 can be made to the described preferred embodiment of the

1 invention, it is intended that all matters in the foregoing  
2 description and shown in the accompanying drawings be  
3 interpreted as illustrative and not in a limiting sense. Thus,  
4 the scope of the invention should be determined by the appended  
5 claims and their legal equivalents.

6 Now that the invention has been described,

